REMARKS

This amendment is submitted in an earnest effort to bring this case to issue without delay.

Applicants wish to reiterate their claim to the benefit of their German priority date of 10 June 2002 pursuant to the International Convention. A certified copy of German Patent Application 102 25 521.0 filed 10 June 2002 has already been made of record in Applicants' PCT/DE03/01834 filed 4 June 2003 of which the instant application is the US National Phase. The Examiner has already acknowledged Applicants' perfected right of priority.

Applicants have amended claims 1 through 5. Antecedent basis for the amendments to these claims may be found in the specification on page 4, line 17, page 5, line 3 through page 6, line 2, and on page 11, second and third paragraphs, as well as in Figures 2b and 3b. Thus claims 1 through 5 and withdrawn claims 6 through 12 remain in the case and are again presented for examination.

The Examiner has rejected claims 1 through 5 under 35 USC 112, second paragraph, as indefinite. Applicants have amended the claims in response to this rejection. Applicants have amended line 1 of claims 1 through 5 to change "two phase" to "substantially two phase". Antecedent basis for this change may be found in the specification on page 4, line 17. By limiting the "cubic phase" to no more than 4% of the binder phase, Applicants do not regard the "cubic phase" which contains un dissolved dopant as an additional phase. Furthermore as Applicants will explain more fully herein below, the cubic phase consisting of undissolved dopant is not always present in the hard metal substrate bodies according to the presently claimed invention.

Applicants have changed "the hard metal" to "the hard metal substrate body" in claim 1, line 8, and there is antecedent basis in the preamble of claim 1 for "the hard metal substrate body." Applicants have amended claim 1, lines 10 and 11 to delete "falls from up to 1μm, preferably up to 0.5 μm" and replaced that expression with "wherein the binder metal content in an edge zone of the two-phase hard metal substrate drops to less than half the binder metal content in the substrate body interior." Thus Applicants are expressing the difference in binder metal content in the interior versus binder metal content at the edge of the hard metal substrata body in terms of a ratio, rather than in terms of absolute quantities.

Applicants have amended claim 3, line 3 to replace "WC fine hard metal" with - WC fine hard material phase - and "WC ultrafine grain hard metal" with - WC ultrafine grain hard material phase - because WC is not a metal.

Applicants believe that all of the amendments presented above remove all bases for rejection of the claims under 35 USC 112, second paragraph, as indefinite.

The Examiner has rejected claims 1 through 5 as last presented as obvious under 35 USC 103 citing US Patent 6,110,603 to CHEN et al. Applicants believe that the Examiner should no longer maintain this basis for rejection in view of the changes made to claims 1 through 5.

The core concept of the present invention lies in producing a two-phase hard metal substrate body (ideally composed of WC and a binder phase) or an essentially two-phase hard metal substrate body having a narrowly limited proportion of the cubic phase. According to Claim 1 as now presented, the content of dopants in the hard medal substrate body has been limited to 4 mass-%. Depending on the setting of the carbon content in the alloy, different quantities of these dopants go into solution in the binder metal. For high proportions of binder metal and a low carbon content setting, all dopants go completely into solution in the binder metal; i.e., the hard metal alloy is free of undissolved dopants, and is therefore free of all proportions of cubic carbides in the structure. A two-phase hard metal substrate body is present which is composed of WC (as hard material phase) and a binder

phase, and which contains at least one dopant in addition to the classic binder metals cobalt, nickel, and/or iron.

In the converse case, namely, when the binder metal proportion is low and a high carbon content setting is selected, the dopants go into solution in the binder metal only to a very slight degree. The remaining undissolved dopants are present in the structure as the "third" cubic , which, however, is limited to a maximum 4 volume-%.

Thus, unlike the cited CHEN et al reference , to be discussed below, in the present case there is a limitation of up to 4% dopants, and there is a maximum 4% of a cubic phase. The present boundary conditions, namely, the limitation to a maximum 4 mass-% of dopants in the hard metal substrate body (which are completely dissolved in the binder metal) or a maximum 4 volume-% of the cubic phase (where a portion of the dopants are not dissolved in the binder metals) represent two borderline cases.

Notwithstanding, the following differences between DE 198 45 376 A1 (or the corresponding US 6,110,603 or US 6,506,226 to CHEN et al) and the present invention must be pointed out:

Even the statement of the object reveals different objectives. According to column 2, lines 40-60 of US Patent 6,110,603, the objective is to develop a hard metal body, which in the form of a cutting insert without additional coating has high wear resistance and cutting strength. According to the present invention, the objective is to provide an improved, essentially two-phase hard metal substrate body which provides better adhesion

for surface coatings deposited from the gaseous phase (see page 4 of the specification).

According to CHEN et al, the hard material phase is composed of at least two phases, namely, WC and a second phase of at least one carbide, nitride, carbon nitride, or oxycarbon nitride of at least one of the elements of the IVa, Va, or Vla group of the periodic table. More specifically the hard material phase in CHEN et al contains 10 mass% to 96 mass% WC, but not 100% WC. See col. 3, lines 10 through 12 and 64 to 65. The binder phase is then added. The fact that an additional hard material phase besides WC must necessarily be present follows from feature a, according to which a carbon nitride phase which is essentially free, preferably completely free, of the binder phase is to be present in a first layer.

Applicants emphasize that in claim 1, now presented, the substantially two-phase hard metal substrate body consists essentially of a WC hard material phase and a binder phase and that the WC hard material phase consists of WC.

In addition, it is clear from a consideration of the exemplary embodiments of CHEN et al that the additional hard material proportion besides WC must be substantial. US Patent 6,110,603 in column 8, last paragraph before the claims, states, in addition to 53 to 66 g WC, a TiC proportion of 30 g; i.e., the TIC proportion in the hard material phase is 31 to 36 mass-% (instead of a maximum 4 volume-% according to the present application). Corresponding contents are stated in CHEN et al, column 4, lines 32

to 37, according to which the TiCN content should be between 3 and 40 mass-% and the TIC or TiN content should be up to 40 mass-%. Chromium and/or molybdenum in a range of 2% may additionally be added to these carbides, nitrides, or carbon nitrides. In other words, the hard metal substrate body described in CHEN et al is always three-phase, whereas the hard metal substrate body according to the presently claimed invention is two-phase or essentially two-phase, provided that, due to a low binder metal proportion or a high carbon content setting, complete dissolution of the dopants in the binder phase is not possible. In that case, however, the corresponding third phase (if it is even applicable) is limited to a maximum 4 volume-%. In contrast to CHEN et al, however, the dopant should be contained in the binder phase completely or at least substantially in the dissolved form.

Thus, the objectives of the cited CHEN et al reference and of the present invention are diametrically opposed. Furthermore, the statement of the object in the present invention would not induce one skilled in the art to consult CHEN et al.

Applicants believe that all claims now presented are in condition for allowance and a response to that effect is earnestly solicited. Applicants are enclosing a petition to obtain a one mon th extension of the term for response and a completed Form PTO 2038 to charge the cost of filing the petition for extension to the credit card of the undersigned attorneys.

Respectfully submitted,
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Enclosure: Request for extension (one month)
PTO 2038 Charge Form

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